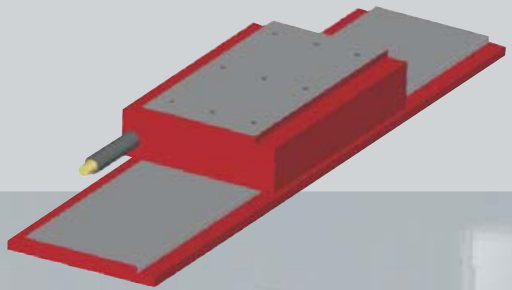
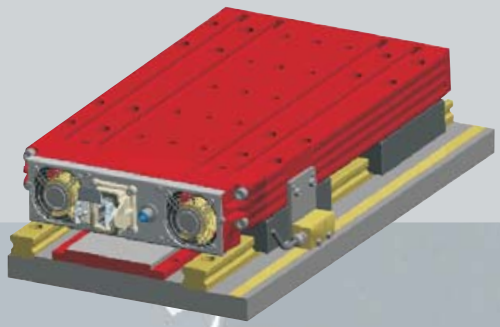
SEW EURODRIVE

SL2 Synchronous Linear Motors

Edition

03/2004





Operating Instructions

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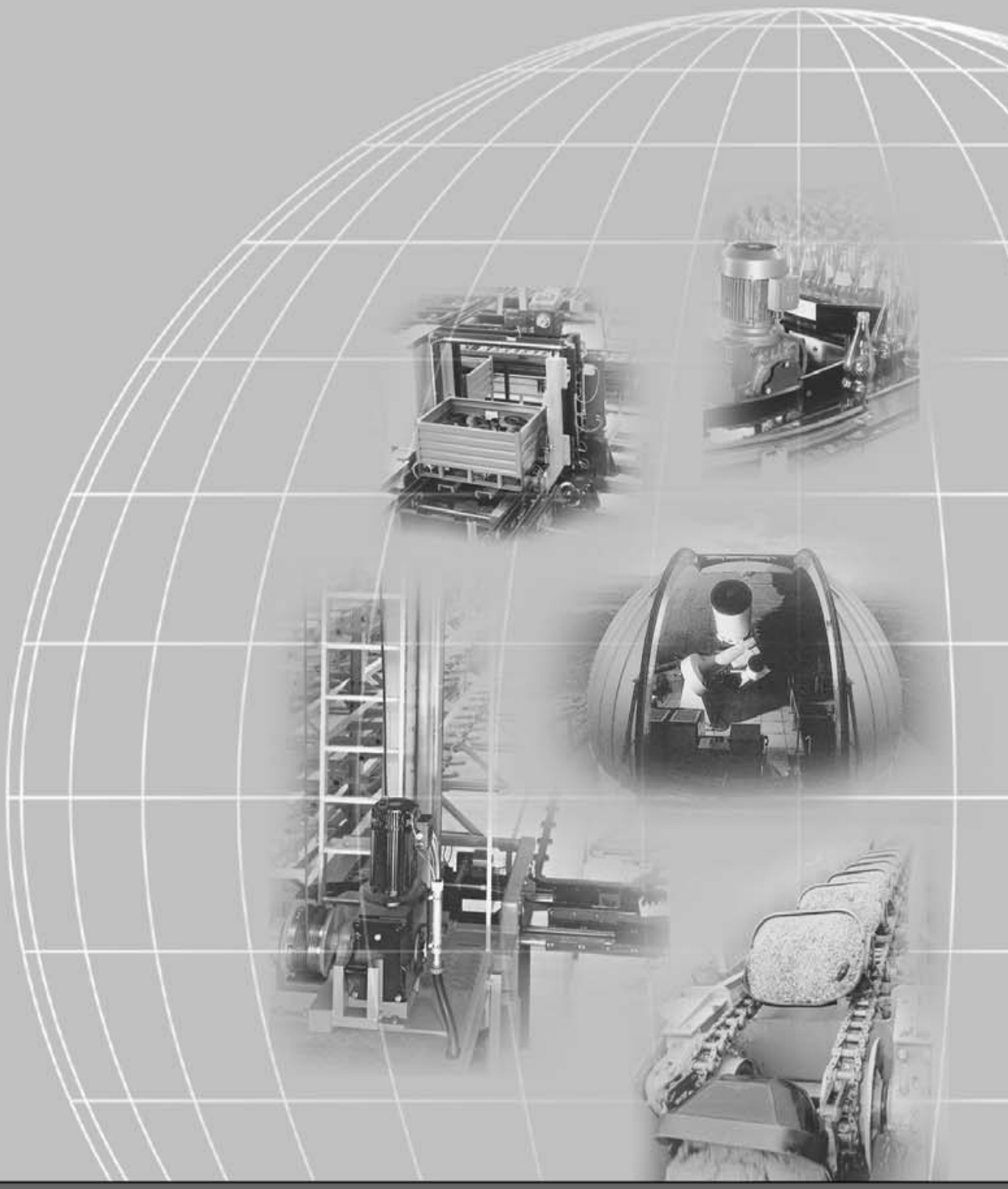

SEW-EURODRIVE

1 Important Notes 4

2 Safety Notes 5
2.1 Transport 9
2.2 Packaging 10
2.3 Corrosion protection and storage conditions 13
2.4 Coating 13
2.5 Return delivery to SEW-EURODRIVE 13

3 Product Description and Overview of Types 14
3.1 System world 14
3.2 Documentation 14
3.3 SL2 Product designs 15
3.4 System components for SL2- Advance System and SL2-Power System 16
3.5 Type code 18
3.6 Nameplate 20
3.7 Scope of delivery system components 21

4 Mechanical Installation 22
4.1 Installation tolerances 22
4.2 Required tools / aids 23
4.3 Assembly 23

5 Electrical Installation 26
5.1 Electrical connection 26
5.2 Thermal motor protection 30

6 Startup 31
6.1 Prerequisites for startup 31
6.2 Sequence of the commutation travel 31
6.3 Startup procedure 33
6.4 Calculation of travel parameters 36

7 Malfunctions 38
7.1 Problems during commutation search 39
7.2 Problems during operation 40

8 Inspection / Maintenance 41
8.1 General maintenance work 41
8.2 Additional maintenance for Power version 41

9 Technical Data 42
9.1 SL2-Basic motor data 42
9.2 Maximum forces with MOVIDRIVE® compact 44
9.3 Part numbers for MOVIDRIVE® compact MCH 47

10 Declaration of Conformity 50
10.1 SL2 synchronous linear motors 50

11 Index 51

1 Important Notes

Safety and warning notes

Danger

Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

Warning

Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury. You will also find this signal to indicate property damage accidents including personal injury risk appropriate to this level.

Caution

Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It also indicates property-damage accidents.

Note

Indicates a reference on the application, such as regarding installation, or other useful information.

Documentation reference

SEW-EURODRIVE GmbH & Co KG makes a reference to existing documentation, such as operating instructions, catalog or data sheet.

A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that you adhere to the information in the operating instructions. Consequently, read the operating instructions before you start operating the drive!

The operating instructions contain important information about servicing and should be kept close to the unit.

Disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic components

Please dispose of the parts in accordance with the applicable regulations.

2 Safety Notes

Preface

Due to the strong permanent magnets installed in the secondaries of the synchronous linear motors, the following safety regulations must be observed.

Work not to be carried out by persons with cardiac pacemakers!

The strong magnetic fields and the associated high ferromagnetic attraction forces can be harmful to your health directly, for example for persons with cardiac pacemakers, or indirectly through fast motor movements and high thrust forces.

Based on current medical knowledge, magnetic fields with a flux density of < 5 mT have no effect on the human body.

DANGER! STRONG MAGNETIC FIELD

Even at a distance of 100 mm, the magnetic flux density of the present secondaries is < 5 mT (at 150 mm < 0,5 mT) . Since the magnetic flux density in SL2 synchronous linear motors is generated exclusively by the magnetic fields of the secondaries, this value is independent from the operating status of the SL2 linear motor.

Special caution needs to be the rule in close proximity (distances < 50 mm) to the secondaries due to the high attraction forces. Magnetic forces are often underestimated since they are not visible.

Magnetic attraction forces often start abruptly in the immediate proximity range and can grow in excess of several 100 kg for medium-sized objects.

Please also take account of the supplementary safety notes in the individual sections of these operating instructions.

General information

DANGER! HOT SURFACES

The surfaces of SL2 synchronous linear motors can be hot (> 100 °C) during or after operation.

All work related to transport, putting into storage, setting up/mounting, connection, startup, maintenance and repair is to be carried out by trained personnel only. Note the following important points.

- Pay attention to the danger and safety signs on the SL2 linear motor.
- Do not go near the secondary with metallic objects that are heavy (> 1 kg) or have a wide surface (> 1 dm²) in your hand.
- Place at least two pointed wedges made of firm, non-magnetic material such as brass or stainless steel (wedge angle ca. 10° - 15°) and a hammer ready to separate the adhering magnetic parts. If necessary (e.g. if mounting space is limited) customized installation appliances should be used to facilitate and safeguard work. To free jammed body parts: Separate adhering parts by driving the prepared pointed wedges (made of firm, non-magnetic material) into the separation gap.
- Do not bring watches and magnetizable data carriers (such as credit cards, disks, etc.) into close proximity <100 mm of the SL2 synchronous linear motors!
- Note the system-specific guidelines and requirements.
- Note the national/regional regulations governing safety and the prevention of accidents.

Serious injuries and property damage may result from:

- Improper use
- Incorrect installation or operation
- Unauthorized removal of necessary protection covers or the housing

Designated use

These electric motors are intended for industrial systems. They comply with the applicable standards and regulations and meet the requirements of the Low Voltage Directive 73/23/EEC.

The technical data and the information about permitted conditions are to be found on the nameplate and in the documentation.

It is essential to observe all specified information!

Transportation/storage

Inspect the shipment for any damage in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

Tighten installed transportation eyebolts [1]. They are designed for the weight of the gearmotor/gear unit only; do not attach any additional loads.

The installed lifting eyebolts comply with DIN 580. Observe the loads and regulations specified in this standard. If the gearmotor is equipped with two suspension eye lugs or lifting eyebolts, then both of the suspension eye lugs should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove securing devices used for transportation prior to startup.

Follow the instructions in the section "Notes on transportation"!

- Mark the storage locations of secondaries ("Danger! Strong magnetic fields", pictograms).
- Never store secondaries unpacked; use non-magnetic packaging material with a thickness of at least 2 cm on the magnetic side!
- Observe the warning instructions on the packaging.
- Keep storage area dry.
- Protect storage site from heat.
- For transportation of machines or components with primaries or secondaries already installed on travel axle(s): Lock the axle(s) to prevent accidental movement (due to missing self-locking mechanism).

Follow the instructions in the section "Transporation and storage"!

Installation / assembly

DANGER! STRONG MAGNETIC FIELD

- Never place secondaries on metal.
- Never place a primary directly on a secondary.
- Hold the tools tight (with both hands). Slowly guide the tools to the secondary.

- Wear work gloves during assembly.
- Do not remove the packaging of the secondary until directly before it is installed.
- Carry out installation work in pairs only.
- Cover already installed secondaries with at least 2 cm of non-magnetic material (e.g. wood) during installation.
- Use customized installation appliances to facilitate and safeguard work, if necessary (e.g. if mounting space is limited).
- Make sure that magnetic rail is grounded according to regulations via PE grounding bar as reference potential in control cabinet.

Please attach the enclosed warning sign in a prominent position or in the vicinity of the secondaries!

Follow the instructions in the section \"Mechanical Installation"!

Startup

- Never work in the travel range when the machine is switched on.
- Ensure free axle travel.
- Check the final positions.
- Check the linear measuring system prior to turning on the machine.
- Limit the maximum power in the servo controller.
- Set the velocity limits in the servo controller to small values.

Follow the instructions in the section "Startup"!

Operation and inspection / maintenance

DANGER! DANGEROUS ELECTRICAL VOLTAGE

- **Induced voltages of up to 500 V can be generated by movement of the primary (generator principle) even if the motor is not connected.**
- **After separating the servo controller from the supply voltage, wait for at least five minutes before you touch any live parts (e.g. contacts, stud bolts) or loosen connections. To be on the safe side, measure the voltage on the DC link and wait until the voltage has dropped below 40 V**.

- Keep motor area free from chips.
- Notice any noises.
- The motors may have a surface temperature of 100 °C during operation. Wait for the motor to cool down to 40 °C before touching it.
- Power connections can conduct voltages even if the motor does not turn. Never disconnect electrical connections of motors while they are energized.
- Wear work gloves when carrying out maintenance and repair work.
- Ensure safe disconnection from the voltage supply before working on the machine.
- Never work in the travel range when the machine is switched on.
- Remove any chips from the motor area on a regular basis.

Follow the instructions in the section "Startup and Maintenance"!

Behavior and immediate measures in case of ACCIDENTS

- Press the EMERGENCY OFF button in case the machine is connected to the power supply system.
- Request first aid immediately.
- You need the tools mentioned before to free limbs jammed in between two synchronous secondaries or a synchronous secondary and a ferromagnetic component (e.g. steel plate, steel carrier, machine bed, tool). Separate the components at the separation gap using the pointed wedge.

The magnetic forces are always present regardless of the operating status of the system!

2.1 Transport

Primaries

The primaries of the SL2 linear motor types

- SL2-P100M/L
- SL2-P150S/M/L
- SL2-P200S/M/L
- SL2-P250VS/S/M/L

with a net weight of more than 18 kg are equipped with the following transportation aids:

1. Packaged primary

STOP

Transportation of the packaged primary with the attached crane slings only. The weight of the primary is indicated on the nameplate or the dimension sheet.

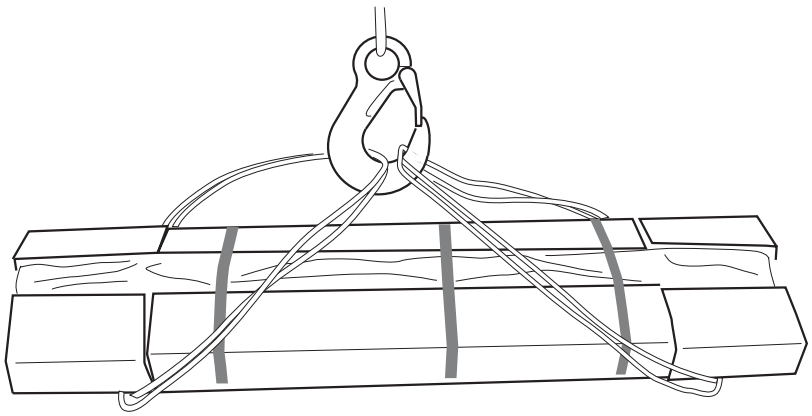

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Figure 1: Packaged primary

2. Unpacked primary

STOP

The primary is equipped with two M8 threads for transportation with lifting eyebolts (parts not included in scope of delivery) for further transportation or handling.

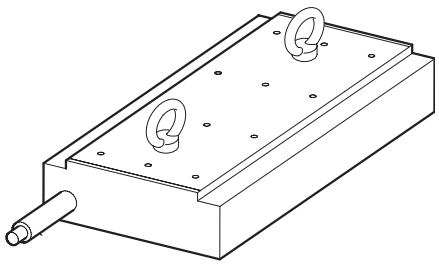

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Figure 2: Lifting eyebolts with primary

2.2 Packaging

Protective cover may not be damaged since it ensures corrosion protection of metal parts.

Primaries

Primaries of size:

- SL2-P050
- SL2-P100
- SL2-P150

are packaged as follows:

1. Cable extension

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Figure 3: Cable extension

2. Plastic bag/Corrosion protection

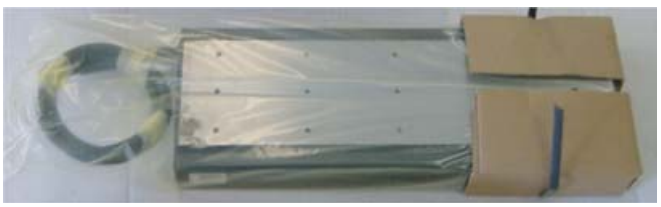

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Figure 4: Plastic bag/Corrosion protection

3. Completely packaged in carton with nameplate

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Figure 5: Packaged primary

Primaries of size:

- SL2-P150
- SL2-P200
- SL2-P250

are packaged as follows:

1. Cable extension

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Figure 6: Cable extension

2. Plastic bag/Corrosion protection

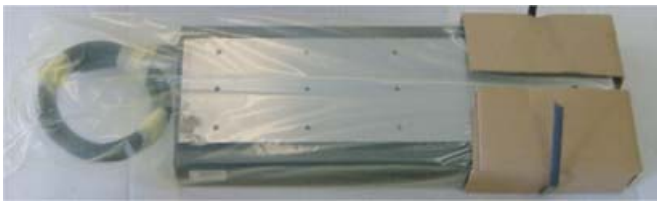

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Figure 7: Plastic bag/Corrosion protection

3. Completely package in carton with plywood support or transport slings

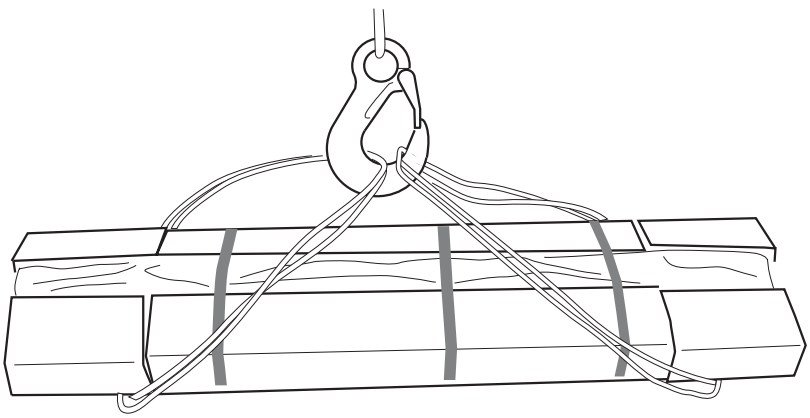

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Figure 8: Packaged primary

Secondary

Protective cover may not be damaged since it ensures corrosion protection of metal parts.

Secondaries of the length

- 64
- 128
- 256
- 512

are packaged as follows:

1. Box with packaging straps

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Figure 9: Box

2. Contents secondary box:
   - Secondary packed in protective cover
   - Safety notes and warning labels enclosed loose inside box
   - Touch guard magnetic surface (wooden board)

2.3 Corrosion protection and storage conditions

The motor parts are protected against corrosion for five years in closed original packaging.

Observe the following storage conditions for SL2 synchronous linear motors:

- Store the SL2 linear motors inside.
- Keep storage area clean and dry.
- Storage temperature in the -5 °C to +70 °C range.
- Relative humidity not to exceed 95 %.
- Original packaging free from damages.

Stored SL2 synchronous linear motors must be equipped with the following warning labels:

- Warning!

- Magnetic!

.

2.4 Coating

The motor parts are coated with AMERLOCK 400C, black matte (EPOXY two-component single coat paint).

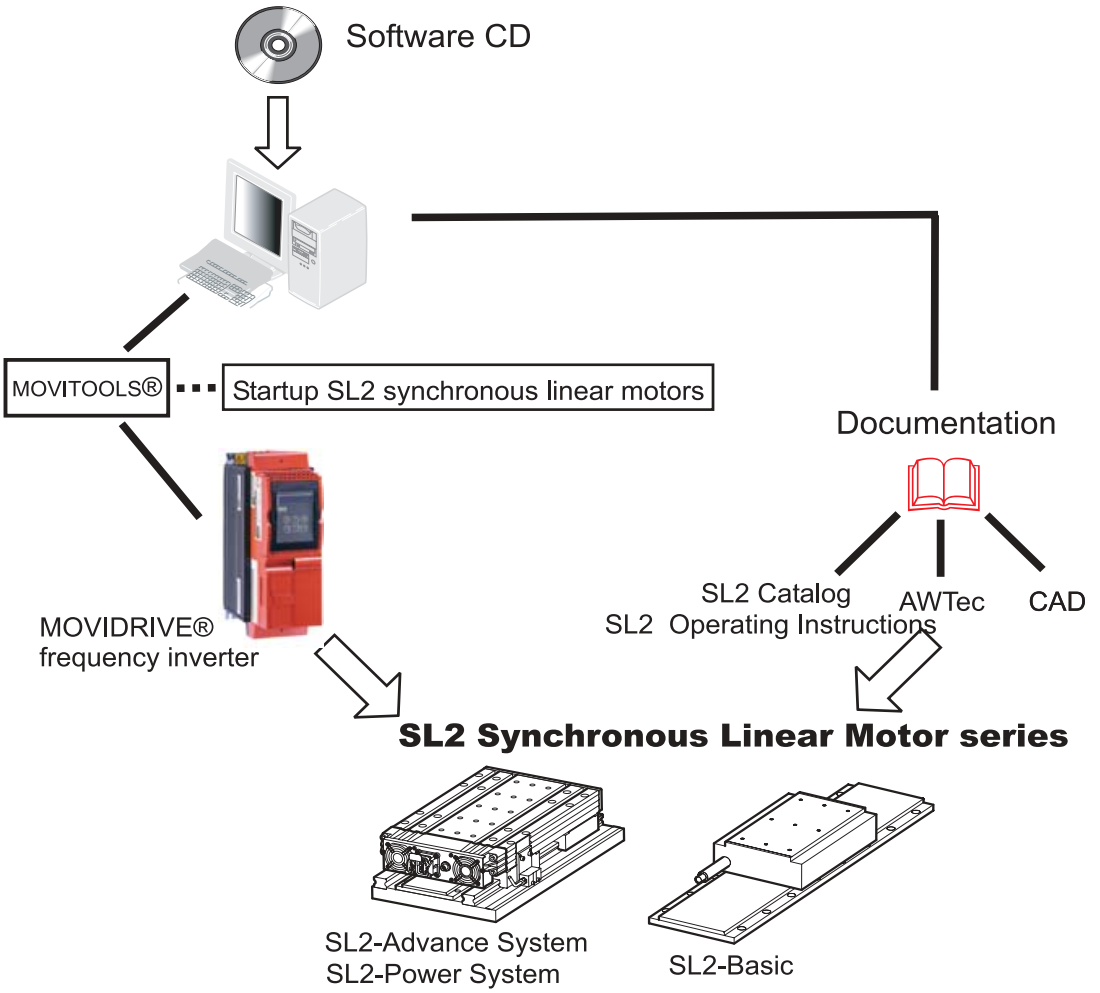
2.5 Return delivery to SEW-EURODRIVE

Return primary and secondary components in original packaging only.

Cover secondaries on the magnetic side with a wooden board (thickness 2 cm) over the entire surface and connect.

3 Product Description and Overview of Types

3.1 System world



3.2 Documentation

- MOVIDRIVE®*compact* manual
- "SL2 Synchronous Linear Motors" catalog
- AWTec "SL2 Synchronous Linear Motors"

3.3 SL2 Product designs

SEW offers **three** product designs of SL2 synchronous linear motors:

SL2-Basic	Primary and secondary components
SL2-Advance System[1)]	Primary integrated in motor cooling unit and secondaries. Prepared for installation of linear guides and the linear encoder.
SL2-Power System[1)]	Motor package integrated in motor cooling unit with forced cooling fan and secondaries. Prepared for installation of linear guides and the linear encoder.

1) available as of third quarter 2004

SL2-Basic

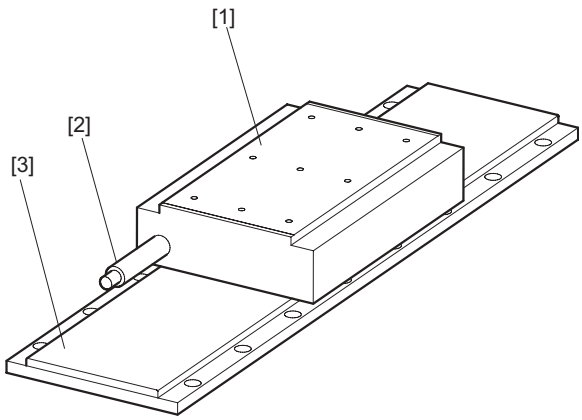


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Figure 10: SL2-Basic synchronous linear motor

[1] Primary
[2] Electrical connection in form of a cable extension
[3[Secondary with permanent magnets

SL2-Advance / SL2-Power System

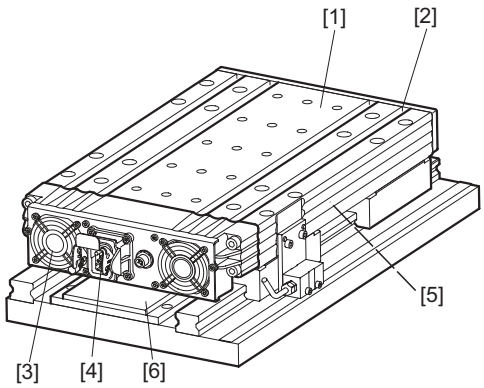

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Figure 11: SL2- Advance System and SL2-Power System synchronous linear motor

[1] Optional motor cooling unit
]2[Prepared grooves as retaining system for customer setup
[3] Forced cooling fan of optional motor cooling unit
[4] Electrical plug connector of optional motor cooling unit
[5] Primary (not visible) installed in motor cooling unit
[6] Secondary

3.4 System components for SL2- Advance System and SL2-Power System

System description

The SL2 linear motor is installed into a motor cooling unit at the factory for product groups SL2-Advance System and SL2-Power System.

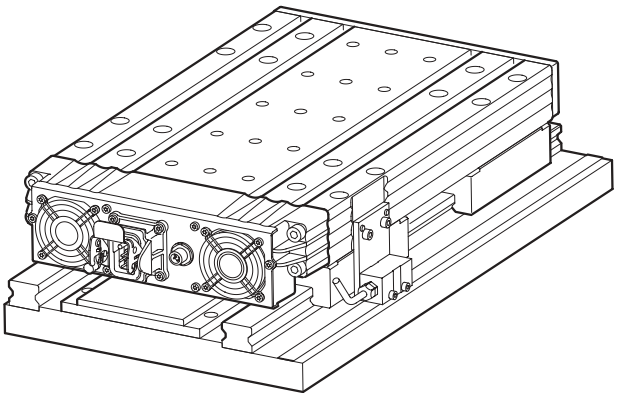

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Figure 12: Synchronous linear motor SL2- Advance System or SL2-Power System with optional motor cooling unit

For motor sizes

- SL2-P050,
- SL2-P100,
- SL2-P150

the motor cooling unit is available for all lengths as system component.

Part drawing of the SL2-Advance System and SL2-Power System

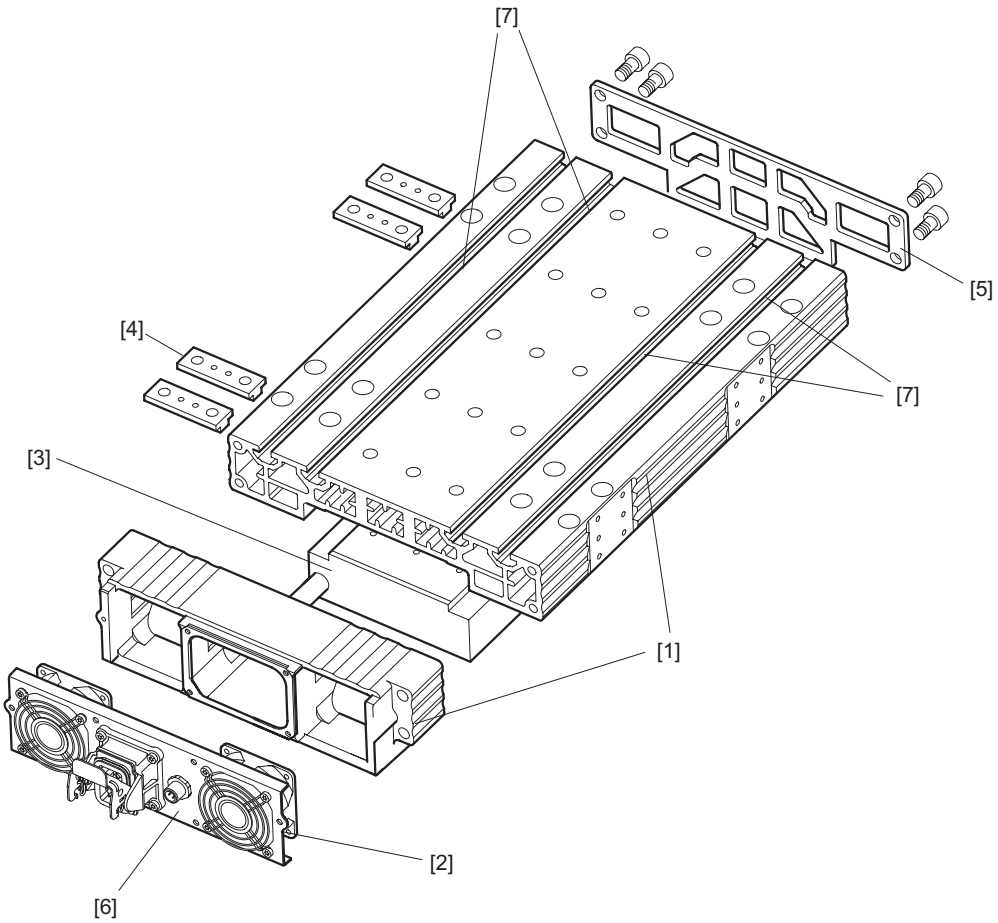


Figure 13: Motor cooling unit

[1] Optional motor cooling unit
[2] Forced cooling fan (in SL2-Power System only)
[3] Primary
[4] Integrated floating bearing for temp. comp.
[5] End plate
[6] Front panel with power plug and fan guard
[7] Grooves for installation of customer components

Design of the subsystems

The motor is installed into the motor cooling unit by SEW-EURODRIVE and connected to a standardized power plug. The 24V power supply for the fans is provided by a separate plug when using forced cooling fans.

Fields of application for the SL2-Advance System

Can basically be used in all fields of application for the SL2 linear motor. There are no limitations.

For use in hoists!

The motor system is not equipped with its own holding brake. An absolute value measuring system is absolutely necessary when using the system as hoist drive. You will find additional information in section 5 of the "SL2 Synchronous Linear Motors" catalog.

Fields of application for SL2-Power System

The use of the motor cooling unit with forced cooling fans is limited to enclosure IP54.

3.5 Type code

The standard design appears in bold.

The following example illustrates the structure for the type code.

Primary

SL2 - P 050 VS - 030 - T - B - KVX1 - 490 - 00

Standard / Special design

Winding voltage
DC link voltage 490 V / 300 V
Cable extension or plug, electrical connection, position, length[1)]

Motor design
B = SL2-Basic
A = SL2-Advance System[2)]
P = SL2-Power System[2)]

T = Temperature sensor TF / K = KTY

V_{rated}: 010 = 1 m/s; **030 = 3 m/s**; 060 = 6 m/s

Length of primary
VS = very short
S = short
M = medium
ML = medium long

Active width of the primary:
50 mm, 100 mm, 150 mm, 200 mm and 250 mm.

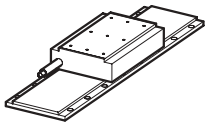
Primary

Second generation of synchronous linear motors

1) Combination of the electrical connection primary, see following overview of combinations.

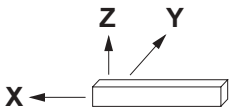
2) Standard design for mechanical air gap between primary and secondary Σ = 0.5 mm. Optional spacers are available for larger air gaps Σ = 1.0 mm and Σ = 1.5 mm.

Overview of combinations for SL2-Basic/cable extension



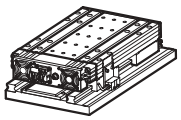
SL2-P...-...-K V X 1-...

- Length of cable extension in [m]
  1 m = standard
  2 m = optional
  4 m = optional
- Position of the cable outlet X (Y,Z)



- Electrical connection
  V = wired; O = open
- K = Cable extension

Overview of combinations for SL2-Advance and SL2-Power System/plug position



SL2-P...-...-S V X 0-...

- Special design
  0 = standard
- Position of connector
  X = standard
- Electrical connection
  V = wired; O = open
- Plug

Secondary

SL2 - S 050 - 128

- Length of secondary
  64 mm, 128 mm, 256 mm and **512** mm
- Active magnet width of the secondary
  50 mm, 100 mm, 150 mm, 200 mm and 250 mm
- Secondary
- Second generation of synchronous linear motors

3.6 Nameplate

Labels are attached to the primaries and secondaries that will show the technical data as follows:

Nameplate primary

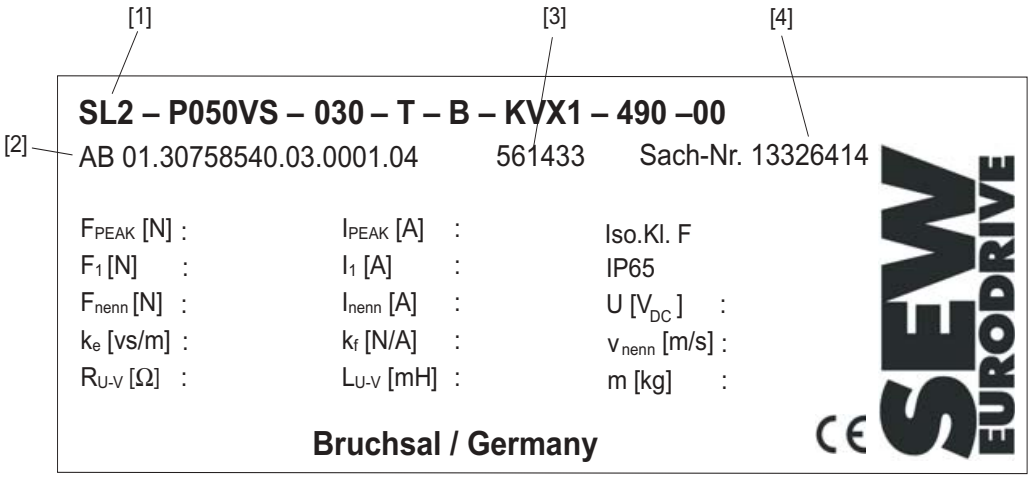


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Figure 14: Nameplate

[1] = Type code
[2] = Customer order number
[3] = Production number
[4] = Part number
F_{PEAK} = Peak force
F_1 = Maximum force available up to v_1
F_{nenn} = Permanent force
k_e = Voltage constant
R_{U-V} = Winding resistance
I_{PEAK} = Maximum current
I_1 = Current at F_1
I_{nenn} = Rated current
k_f = Force factor
L_{U-V} = Inductance
Iso.KL.F = Insulating material class F
IP65 = Enclosure
U = Voltage
v_{nenn} = Velocity up to which the rated force is available
m = Weight

Nameplate secondary

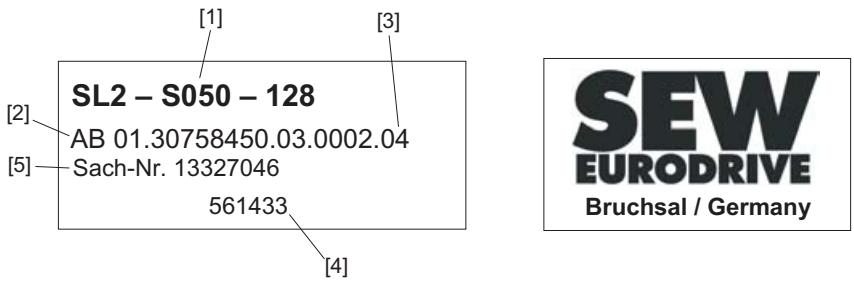

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Figure 15: Nameplate

[1] = Type code
[2] = Customer order number
[3] = Date of production
[4] = Production number
[5] = Part number

3.7 Scope of delivery system components

The scope of delivery for SL2 series synchronous linear motors comprises:

- Primaries
- Secondaries with permanent magnets
- SL2-Advance System
  - Primary installed in motor cooling unit
  - Wired electrical plug connector
  - T-slot nuts for mounting of customer loads are included
- SL2-Power System
  - Primary installed in motor cooling unit
  - Wired electrical plug connector
  - Forced cooling fan completely assembled and electrically wired to M12 plug connector
  - T-slot nuts for mounting of customer loads are included
- Trailing, prefabricated motor cables with integrated TF line only in connection with SL2-Advance System and SL2-Power System

Not included in the scope of delivery:

- Linear guide systems
- Encoder systems
- Cable carriers
- Brake systems
- Buffer/Shock absorber
- Dirt scraper/Bellows

4 Mechanical Installation

It is essential to comply with the safety notes in Section 2 during installation!

4.1 Installation tolerances

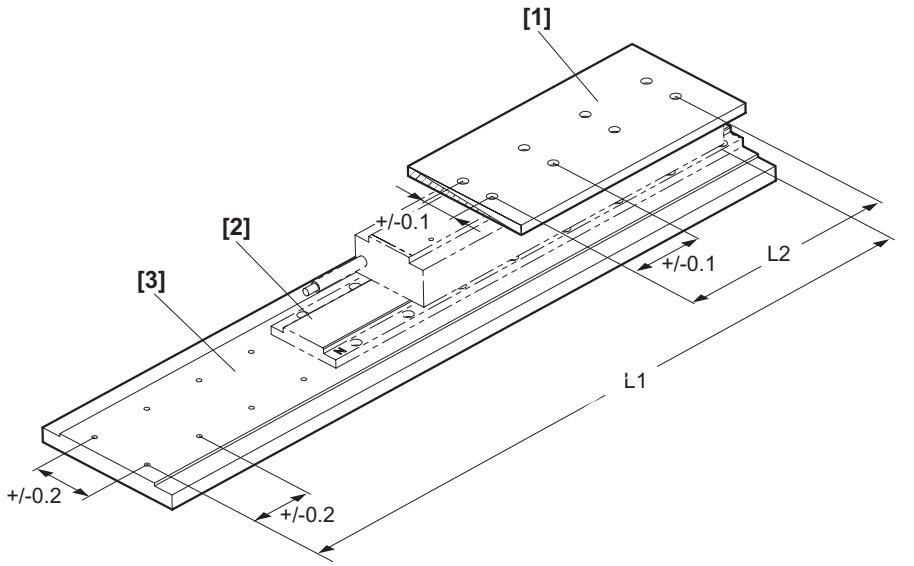

Figure 16: Tolerances

[1] Installation of primary
in reference to the largest primary, max. deflection length and width 0.1 mm
[2] Secondary
in reference to 512 mm length, max. deflection 0.1 mm
[3] Installation of secondary
[L1] ± 0.3 mm in reference to total length
[L2] ± 0.2 mm in reference to total length

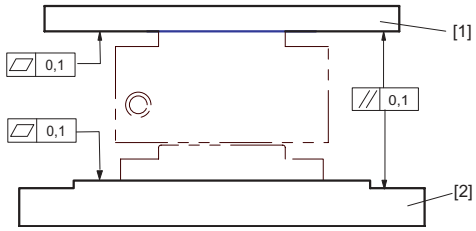

Figure 17: Tolerance of position for entire unit

[1] Installation of primary (mounting plate)
[2] Installation of secondary (basic body, e. g machine base)

Shape and position tolerances in reference to 1000 mm length

The shape and position tolerances are necessary for the function of the SL2 linear motor. Depending on the used measuring system, it may be necessary to have a greater accuracy of the mounted parts for safe operation.

These shape and position tolerances will have to be observed in operating mode at steady-state temperature of the SL2 linear motor. You will also have to take into consideration the influence of the loads installed by the customer.

4.2 Required tools / aids

- Standard tool
- Operation with conductor end sleeves: Crimping tool and conductor end sleeves (without insulation shroud, DIN 46228, Part 1, Material E-Cu)
- Crimping tool for plug connectors

4.3 Assembly

Before you begin Check that

- the information on the nameplate of the drive and/or the output voltage of the servo controller match the voltage supply system,
- the drive is undamaged (no damage caused by transportation or storage).
- it is certain that the following requirements have been met:
  - ambient temperature between +5°C and +40°C[1)]
  - no oil, acid, gas, vapors, radiation, etc.
  - installation altitude max. 1000 m above sea level[1)]

Start with the installation of the primary. Install the secondaries after having concluded all other installation work immediately prior to startup of the drive. Observe the safety notes when handling the secondaries (see section 2).

1) Observe the derating information

Preparing the SL2-Basic primary for installation

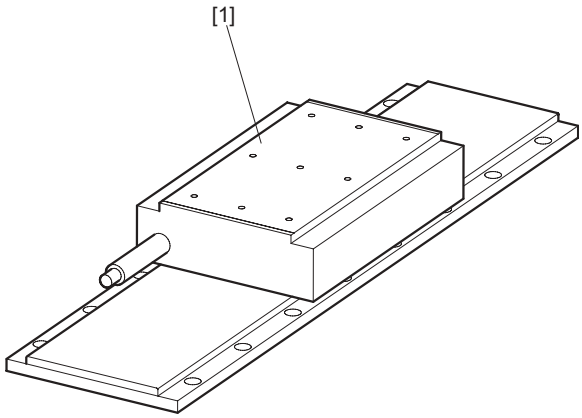

Figure 18: Primary SL2-Basic

Mounting surfaces [1]:

The mounting surfaces of the primary were treated with an anti-corrosion agent at the factory. Do not remove this protection layer. Wipe the surface with a lint free cloth to remove any dust, dirt, etc. clinging to the surface.

Retaining screws:

Use **all** M5 tapped holes in the mounting surface for retaining purposes. Use screws of size M5, property class 8.8 or higher. The minimum depth of engagement is 8 mm. The tightening torque is always 6 Nm and may not be exceeded, even with screws of a higher property class. Secure screws against loosening.

We recommend commercial screw locking adhesive, such as Loctite no. 641.

Preparing secondaries for assembly

Caution! Do not unpack parts until you are ready for installation.

The mounting surfaces of the secondary were treated with an anti-corrosion agent at the factory. Do not remove this protection layer. Wipe the surface with a lint free cloth to remove any dust, dirt, etc. clinging to the surface.

Installation of secondaries

Bore all holes required for installation of the secondaries into the machine base.

Install the first part at one end of the travel distance and work your way down in one direction. The orientation of the first part can be random. The adjoining part will have the same orientation. The north (N) and south (S) pole are identified on the secondaries (→ see Figure 19). You can combine secondaries of different lengths.

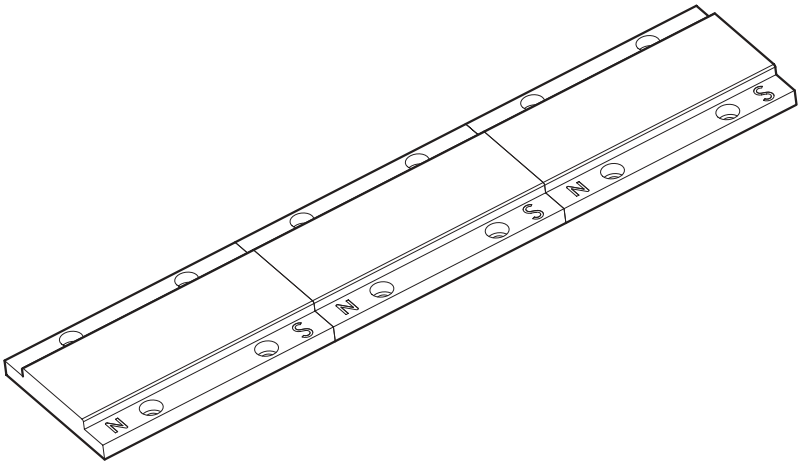

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Figure 19: Arrangement of secondaries

Use **all** sunk surfaces of the secondary for retaining purposes. Use screws of size M6, property class 8.8 or higher. Engagement depth and tightening torque depend on the customer support structure. Secure screws against loosening.

We recommend commercial screw locking adhesive, such as Loctite no. 641.

Move primary over secondaries by hand prior to startup of drive to check for unhindered operation.

Induced voltages of up to 500 V can be generated by movement of the primary (generator principle) even if the motor is not connected.

Use non-magnetic testing devices, such as feeler gauges made of stainless steel, aluminum, brass or copper sheets if you are planning to check the visible air gap.

5 Electrical Installation

It is essential to comply with the safety notes in section 2 during installation!

Observe the wiring instructions issued by the manufacturer of the servo controller in case motors are powered by inverters. It is essential to observe the operating instructions for the servo controller.

5.1 Electrical connection

Switching and protection gear

Permanent-field SL2 synchronous linear motors must be protected against overloads and short circuits.

Install the motors with sufficient space for air to cool them.

The surface temperature may be in excess of 100 °C during operation. Provide preventive measures against inadvertent contact.

The motors are available with temperature detection (TF or KTY) to protect the motor winding against overheating. The standard design of motor windings is thermal classification F. The standard equipment for these motors is **temperature sensor TF** (thermal classification F).

Temperature sensors TF meet DIN 44081 or DIN 44082. These motors are also available with **temperature sensor KTY** upon request.

The TF signal can be evaluated directly in the servo controller when using a MOVIDRIVE® servo controller.

Temperature sensors will respond at the maximum permitted winding temperature. Integrate the contacts of the temperature monitoring device into the monitoring circuit.

Project planning cable cross section

Maximum required cable cross section depending on cable length l [m] and current I]A[

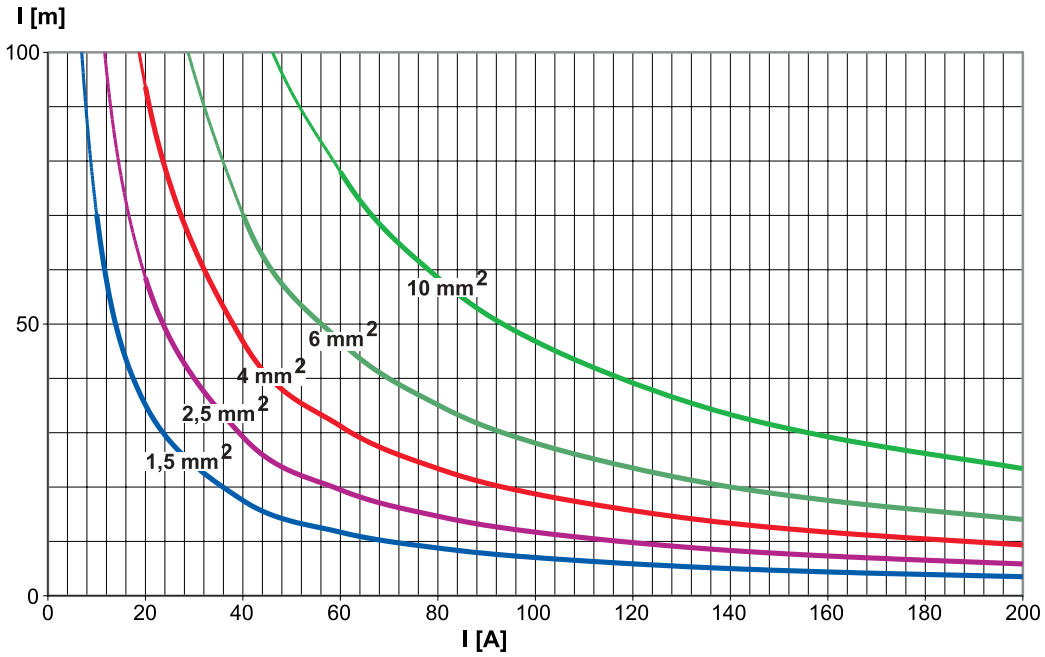


Figure 20: Cable cross section depending on cable length l [m] and current I]A[

Cable load through current I in [A] according to EN 60204 see the following table, ambient temperature 40 °C

Cable cross section [mm^2]	Three-core sheathed cable in pipe or duct	Three-core sheathed cable on top of each other on wall	Three-core sheathed cable lined up horizontally
1,5	12,2	15,2	16,1
2,5	16,5	21,0	22
4	23	28,0	30
6	29	36,0	37
10	40	50,0	52
16	53	66,0	70
25	67	84,0	88
35	83	104,0	114

These data are merely recommended values and are no substitute for the detailed project planning of the cables depending on the concrete application considering the applicable regulations!

Consider the voltage drop along the cable when dimensioning the cross section for the fan supply.

EMC measures

The designated use of SEW-EURODRIVE SL2 synchronous linear motors is as components for installation in machinery and systems. The designer of the machine or system is responsible for complying with the EMC Directive 89/336/EEC.

You will find detailed information on this topic in the SEW publications **"Practical Drive Engineering, Project planning for drives" and in "Practical Drive Engineering volume 9, EMC in Drive Engineering".**

Encoder connection

Please observe the following instructions when connecting an encoder:

- Use a shielded cable with twisted pair conductors only.
- Connect the shield to the PE potential on both ends over a large surface area.
- Route signal cables separately from power cables or brake cables (min. distance 200 mm).

Motor cable assignment

Motor type	Force			Speed		Current			Cables
	F_{Peak} [N]	F_1 [N]	F_{Nenn} [N]	v_1 [m/s]	v_{Nenn} [m/s]	I_{Peak} [A]	I_1 [A]	I_{Nenn} [A]	
SL2-50VS	650	500	280	- 3 6	- 3,4 8,0	- 6,0 13,9	- 4,4 10,3	- 2,2 5,3	- 3 x 1.5 3 x 1.5
SL2-50S	1300	1000	560	1 3 6	1,3 3,4 6,9	4,8 11,8 24,5	3,5 8,7 17,8	1,8 4,5 9,0	3 x 1.5 3 x 1.5 3 x 1.5
SL2-50M	1950	1500	840	1 3 6	1,1 3,3 6,4	5,9 18,0 33,0	4,4 12,8 24,6	2,2 6,5 12,6	3 x 1.5 3 x 1.5 3 x 1.5
SL2-50ML	2600	2000	1120	1 3 6	1,1 3,4 6,9	7,8 24,0 48,0	5,8 17,8 35,5	2,9 9,1 18,2	3 x 1.5 3 x 1.5 3 x 2.5
SL2-100VS	1325	1000	600	1 3 6	1,1 3,8 6,9	4,8 14,2 24,6	3,4 10,3 17,8	1,9 5,6 9,7	3 x 1.5 3 x 1.5 3 x 1.5
SL2-100S	2650	2000	1200	1 3 6	1,1 3,4 6,9	8,0 25,0 49,0	5,8 17,8 35,5	3,1 9,7 20	3 x 1.5 3 x 1.5 3 x 2.5
SL2-100M	3970	3000	1800	1 3 6	1,3 3,2 6,9	14,2 35,0 75,0	10,3 24,6 53,3	5,6 13,5 29,2	3 x 1.5 3 x 1.5 3 x 4
SL2-100ML	5300	4000	2400	1 3 6	1,1 3,4 7,0	16,0 49,0 100,0	11,5 35,5 74,4	6,3 19,5 40,7	3 x 1.5 3 x 2.5 3 x 6
SL2-150VS	2000	1500	900	1 3 6	1,1 3,3 6,4	6,1 18,0 35,0	4,4 12,8 24,6	1,9 7,0 13,5	3 x 1.5 3 x 1.5 3 x 1.5
SL2-150S	3900	3000	1800	1 3 6	1,1 3,2 6,4	12,0 33,5 67,0	8,7 24,5 49,0	4,8 13,5 27,0	3 x 1.5 3 x 1.5 3 x 4
SL2-150M	5800	4500	2700	1 3 6	1,1 3,4 6,4	18,0 53,0 100,0	13,1 39,0 74,5	7,2 21,5 40,7	3 x 1.5 3 x 2.5 3 x 6
SL2-150ML	7700	6000	3600	1 3 6	1,1 3,7 6,4	24,0 76,0 132,0	17,4 56,7 98,0	9,4 31,0 53,8	3 x 1.5 3 x 4 3 x 6
SL2-200VS	2700	2000	1260	1 3 6	1,1 3,4 7,6	8,1 25,0 55,0	5,7 17,8 39,2	3,3 10,2 22,5	3 x 1.5 3 x 1.5 3 x 2.5
SL2-200S	5200	4000	2520	1 3 6	1,1 3,4 7,2	15,6 48,2 101	11,5 35,5 74,4	6,6 20,4 42,7	3 x 1.5 3 x 2.5 3 x 6
SL2-200M	7800	6000	3780	1 3	1,1 3,4	23,4 72,0	17,2 53,3	9,9 30,1	3 x 1.5 3 x 4
SL2-200ML	10350	8000	5040	1 3	1,1 3,6	30,6 100,0	22,7 74,4	13,0 42,8	3 x 1.5 3 x 6
SL2-250VS	3170	2400	1500	1 3 6	1,2 3,5 6,6	10,0 30,0 57,0	7,3 21,8 41,2	4,1 12,4 23,5	3 x 1.5 3 x 1.5 3 x 2.5
SL2-250S	6300	4800	3000	1 3 6	1,1 3,3 6,6	18,7 57,0 113,0	13,6 41,2 82,4	7,8 23,5 47,0	3 x 1.5 3 x 4 3 x 6
SL2-250M	9450	7200	4500	1 3	1,1 3,5	30,0 90,0	21,8 65,0	12,4 37,5	3 x 1.5 3 x 6
SL2-250ML	12600	9600	6000	1 3	1,1 3,3	37,0 113,0	27,2 82,5	15,5 47,0	3 x 1.5 3 x 6

Connection assignment

These values apply to SL2-Basic with standard cable length 1m.

This table does not apply to SL2-Advance System and SL2-Power System.

Connection assignment Rated cross section [mm²]	1,5	2,5	4,0	6,0	10
Outer diameter [mm]	9,6	10,8	13	17,5	20,5
Conductors	4 x 1.5 + 1 x (2x 0.5)	4 x 2.5 + 1 x (2 x 0.5)	4 x 4.0 + 1 x (2 x 0.5)	4 x 6.0 + 1 x (3 x 1.5)	4 x 10 + 1 x (3 x 1.5)
Load [A] at ambient temperature 30 °C	18	26	34	44	61
Load [A] at ambient temperature 40 °C	15,5	23	30	40	55
Load [A] at ambient temperature 60 °C	11,7	16,8	24	31	43
Color of power cores	black	black	black	black	black
Identification phase U	1	1	1	U/L1	U/L1
Identification phase V	2	2	2	V/L2	V/L2
Identification phase W	3	3	3	W/L3	W/L3
Color protective earth	Green / yellow	Green / yellow	Green / yellow	Green / yellow	Green / yellow
Color thermistor core (TF1)	white	white	white	black	black
Color thermistor core (TF2)	brown	brown	brown	black	black
Identification thermistor (TF1)	-	-	-	1	1
Identification thermistor (TF2)	-	-	-	2	2
				3. core not assigned	3. core not assigned
Minimum bending radius fixed routing [mm]	20	22	26	53	62
Minimum bending radius at constant motion [mm]	96	110	130	175	205

5.2 Thermal motor protection

TF temperature sensor

Do not apply any voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082 or >DIN44081.

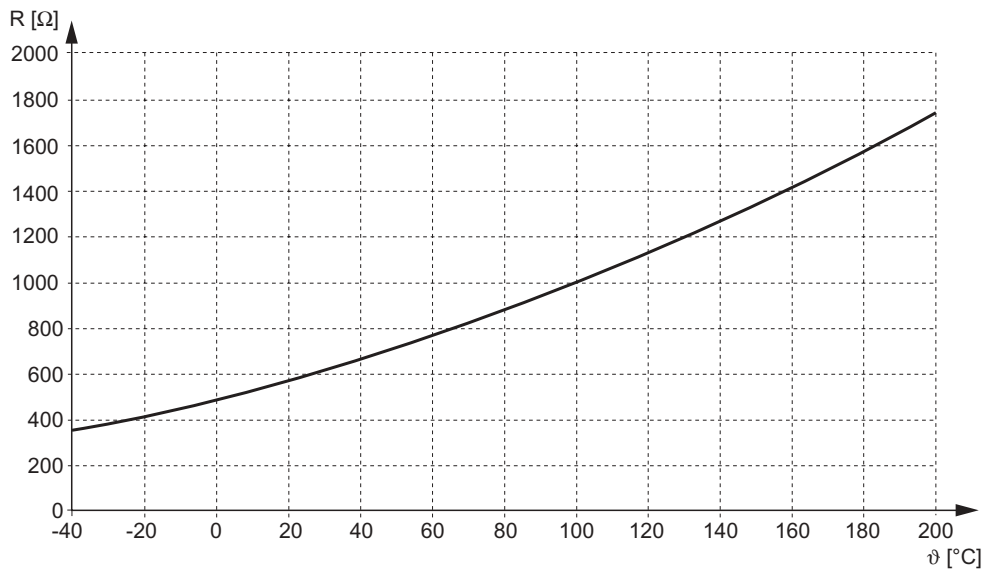
Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20...500 Ω, thermal resistance > 4000 Ω

Temperature sensor KTY

- It is absolutely necessary to observe the correct connection of the KTY to ensure a correct evaluation of the temperature sensor.
- Avoid currents > 4 mA in the circuit of the KTY since high self-heating of the temperature sensor can damage its insulation and the motor winding.

The characteristic curve in the following figure shows the resistance curve with a measuring current of 2 mA.



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6 Startup

6.1 Prerequisites for startup

It is essential to comply with the safety notes in Sec. 2 during startup!

Before startup, make sure that

- the primary moves along the entire travel distance with easy movement, without collisions and free from mechanical contact between primary and secondary,
- all connections have been made properly,
- all protection devices have been installed correctly,
- all motor protection devices are active
- the brake works correctly in hoists
- you have a MOVIDRIVE® with a firmware that supports SL2 linear motors (e. g. MCH xxx -08; MDV xxx -08)
- there are no other sources of danger present
- the startup software MOVITOOLS® is installed on your PC.

6.2 Sequence of the commutation travel

Contrary to rotating systems, there is no mechanical connection between encoder system, primary and secondary in SL2 linear motors.

This connection must be established during startup. The SL2 synchronous linear motor can be controlled directly by the servo controller after initial setup.

This process is referred to as commutation search or commutation travel.

This takes place

- once after "encoder adjustment" for absolute distance measuring systems
- every time the unit is turned on or reset in case of incremental distance measuring systems.

Sequence of the commutation travel

1. The SL2 linear motor is moved to a random position in positive or negative direction (0 mm up to 16 mm away from the current position). Here the SL2 linear motor will stop for about one second.

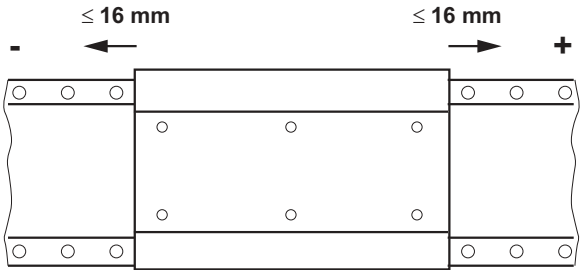

Figure 21: Commutation travel 1st cycle

2. The SL2 linear motor is moved by 32 mm in the positive direction. Here it will stop for about one second.

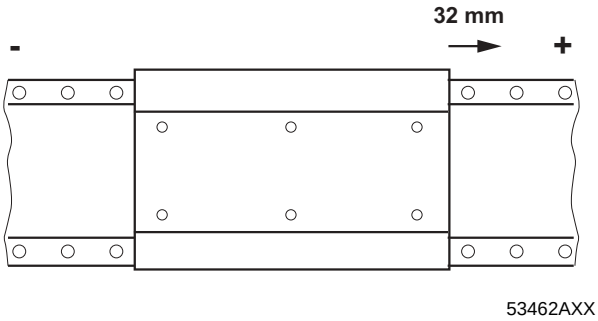

Figure 22: Commutation travel 2nd cycle

3. The SL2 linear motor is moved by 32 mm in the negative direction. Here it will stop for about one second.

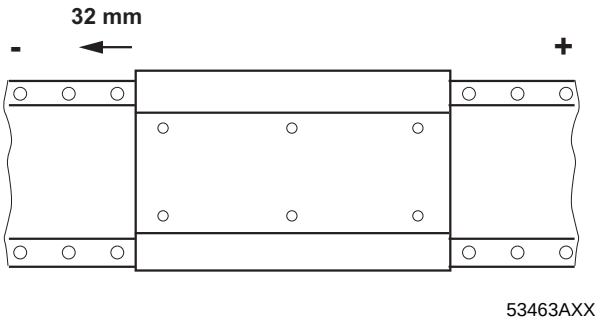

Figure 23: Commutation travel 3rd cycle

The SL2 linear motor will repeat the commutation travel if it reaches a hardware limit switch during commutation travel. That causes the SL2 linear motor to approach a new start position that is moved in by 32 mm and repeat the commutation travel.

You will then hear a little cracking noise and the SL2 linear motor switches from controlled to automatic operation.

6.3 Startup procedure

Proceed as follows to do this:

Parameter setting

1. Make sure that the servo controller is in controller inhibit or 24V operation mode.
2. Execute startup for linear motor in MOVITOOLS® Shell starting with factory setting.

   Refer to the online help for linear motor startup. Parameter setting is complete once you have pressed the "Download" button twice and the window in Figure 4 is displayed again. Exit the startup window at this point.

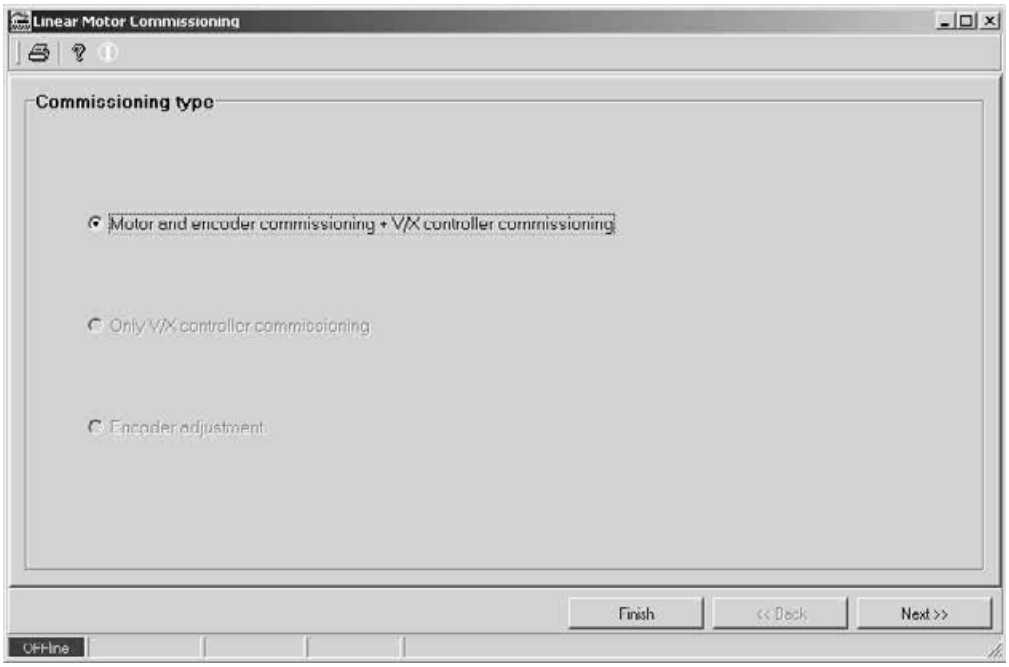

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Figure 24: Main dialog for startup of SL2 linear motors in menu "Startup → SL2 Synchronous linear motors"

Checking encoder evaluation

3. Manually slide the parameter in one direction and observe parameter P003 (actual position) in MOVITOOLS® Shell. Determine the positive direction of movement. Then slide the SL2 linear motor once over the entire travel distance to check if the encoder works correctly in all areas.

Check hardware limit switches

4. Set the parameters for the hardware limit switches such as in Figure 5 and check their function by manually sliding the primary to the limit switches.

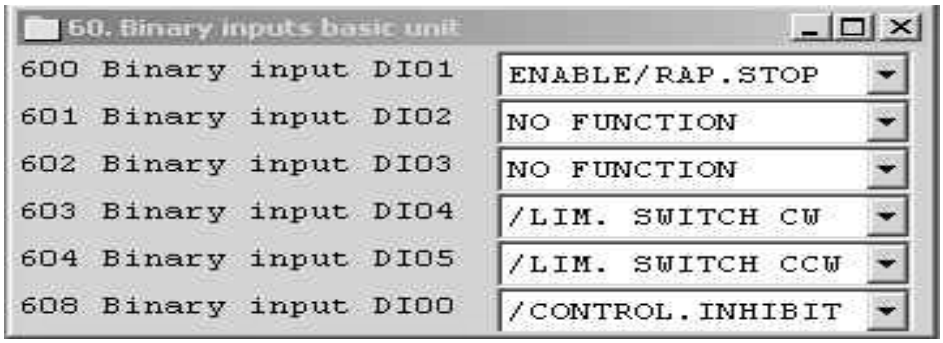

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Figure 25: Binary inputs basic unit

Activate drive limits for initial startup

5. For initial startup limit the maximum speed via parameter P302 (max. speed 1) and the maximum force with parameter P304 (torque limit) so that the motor cannot develop its full force and speed in case of an uncontrolled axle movement.

Do **not** limit the maximum force with parameter P303 (current limit 1) and do **not** limit the maximum speed in the first dialog of the linear motor startup (this is the dialog that appears after Figure 4) because these parameters also affect internal system values.

Commutation travel

6. Deactivate the controller inhibit DI00=1. The SL2 linear motor will now start the commutation sequence described above. See section 7 for troubleshooting of errors that may occur during commutation travel.

Under no circumstances may enable be present during commutation travel!

The variable H458=1 will be automatically set by the servo controller after successful commutation travel. This value will later evaluated by the IPOS$^{plus®}$ program or in the PLC later to permit servo controller enable.

Optimize axle

7. Write a short program to have the SL2 linear motor move cyclically between two positions.

   Start the program and in the linear motor startup (see Figure 4) carry out the point "V/X controller startup only." If the SL2 linear motor moves correctly, set the current and force limits to their original values (see point 5) and optimize the drive control loop via *"Stiffness*" and the button "*Estimate*" (see Figure 6) as you would with rotary servomotors.

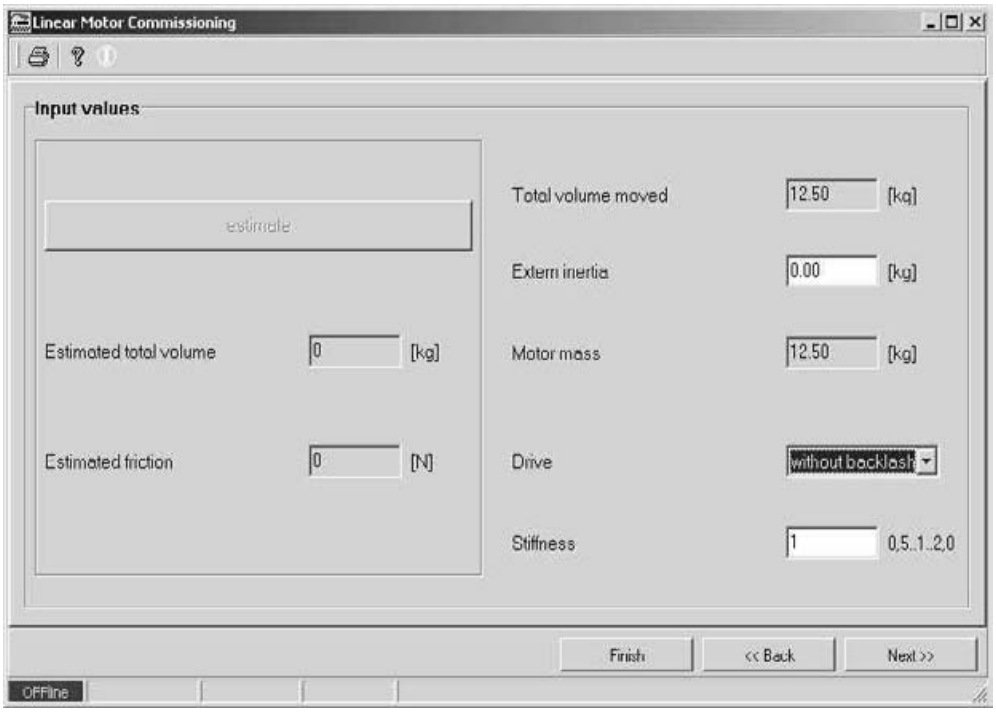

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Figure 26: Dialog for optimum setting of axle with button "Estimate" and input field "Stiffness"

Additional settings

8. With an absolute encoder, you will now execute the menu item "Encoder adjustment". The SL2 linear motor is then ready for operation immediately once the system is turned on. If you do not carry out the menu item "Encoder adjustment", an absolute encoder will behave like an incremental encoder and the SL2 linear motor will carry out a commutation travel once the controller inhibit has been removed and the unit turned on.

9. If you need a different positive encoder counting direction for your linear axis, activate the reversal option for the motor rotation via parameter P350.

10. Remove the TF line from the servo controller with the motor at standstill or enabled to check if the TF monitoring is responding (Error 31; TF trigger).

11. If the drive has an external brake, we recommend addressing it directly. Brake control takes place via parameters P730 - P732.

6.4 Calculation of travel parameters

The servo controller and the integrated IPOS$^{plus®}$ sequence control work internally with rotary values. During startup, the program determines conversion factors for linear values to rotary values.

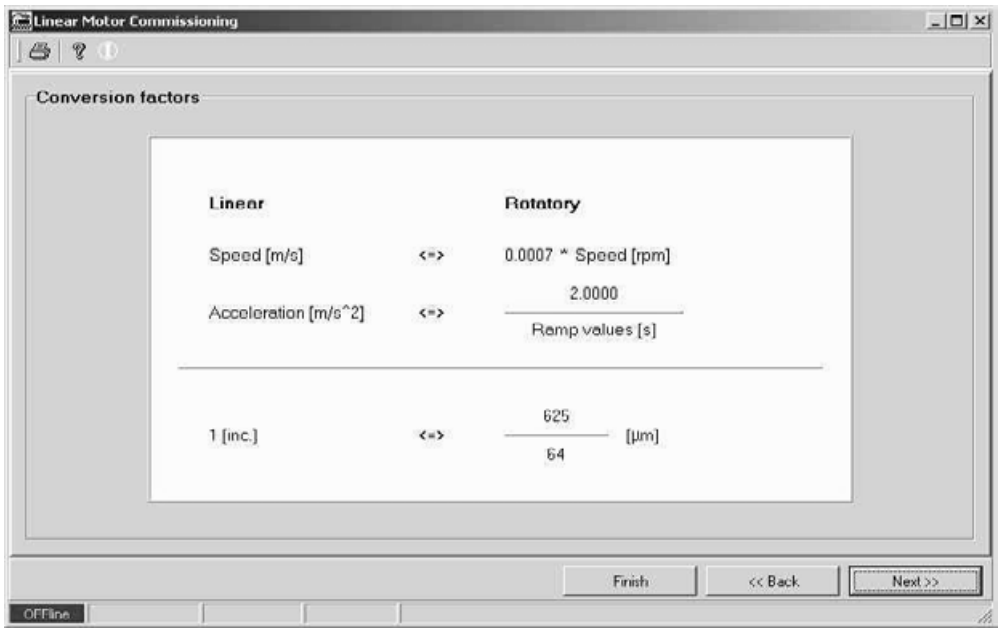

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Figure 27: Conversion factors for SL2-100M-030 with Hiperface encoder at the end of linear motor startup

Example:

A synchronous linear motor SL2-100M-030 with Hiperface encoder is to be operated with the following travel information:

v = 1m/s

s = 1000 mm

a = 5 m/s^2

Based on the conversion factors shown above, the following rotary information will show up in IPOS$^{plus®}$ or via fieldbus:

Speed = 0.0007 / velocity = 1428 1/min

Distance = 64 / 625 × 1000 = 102400 increments

Ramp = 2.000 / 5 = 0.4 sec.

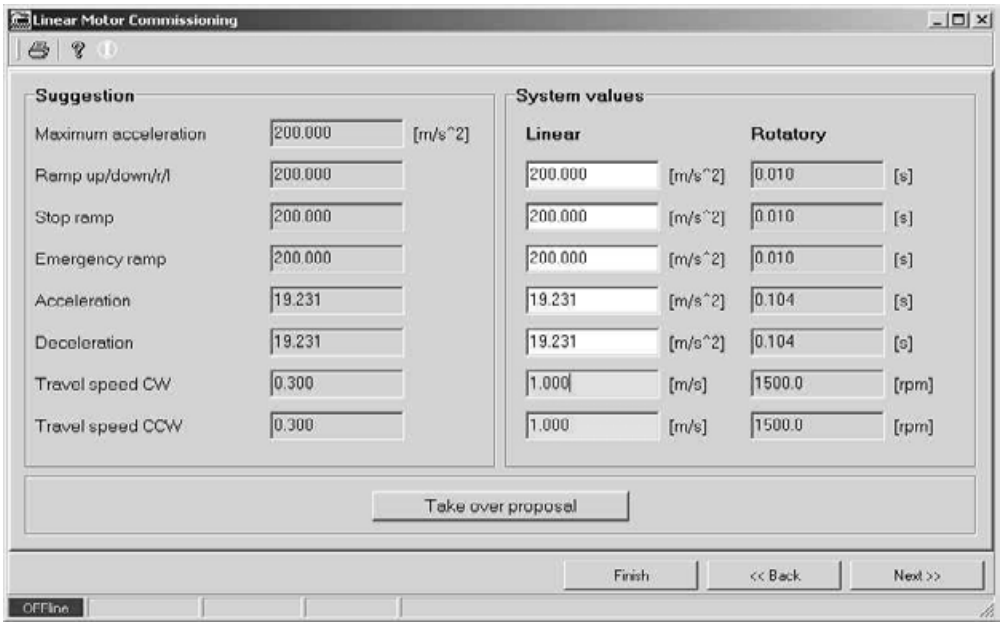

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Figure 28: Dialog in linear motor startup with internal conversion of linear values to rotary values

The values in Figure 7 are rounded off. You can calculate the exact rotary values for IPOS$^{plus®}$ from the linear values with the last dialog of the V/X controller startup. In Figure 8 a set speed of 1500 1/min was calculated for IPOS$^{plus®}$ after input of the positioning velocity 1m/s.

7 Malfunctions

The servo controller reports malfunctions depending on type via diagnostic LEDs or a 7-segment display and an error code. Consult the system manual or the operating instructions for the respective MOVIDRIVE® for troubleshooting. The following notes offer additional information for troubleshooting especially for SL2 synchronous linear motors.

Problems may occur that are hard to localize if the EMC wiring is not carried out correctly. These are often coupled into the servo controller by the TF lines running in the same duct as the motor cable. We recommend disconnecting the TF for test purposes (set P835 to no response) during commutation travel to exclude this error.

Motor monitoring is off. Make sure that there is no thermal overload at the SL2 linear motor! Otherwise the linear motor will be destroyed. Make sure to connect the TF monitoring after successful troubleshooting and set parameter P835 to EMERGENCY STOP / FAULT.

7.1 Problems during commutation search

Problem	Possible cause	Remedy
Encoder error (14) when SL2 linear motor is moved manually	Resolver not mounted correctly	Check mounting with the help of encoder manufacturer information: 1. Air gap encoder - measuring tape 2. Alignment encoder - measuring tape 3. with Hiperface® encoder: Check mounting direction so that cable output shows in direction smaller absolute values (direction "dot" on the measuring tape if present)
	Encoder not connected correctly	Check pin assignment, operate Hiperface® encoder as sin/cos encoder for test purposes
SL2 linear motor does not start after removal of CONTROLLER INHIBIT	Motor cable interrupted	Check linear motor connection
	Brake function P730 = ON	P730 must be set to OFF for commutation search
	(only for Hiperface® encoder) servo controller reports that encoder has already been adjusted (H458=1)	If you want to carry out a commutation travel, enter "Encoder adjustment" in the startup dialog; the servo controller will reset the bit automatically in this case
n-monitoring/ setpoint deviation during commutation travel	Servo controller not in status "NO ENABLE" because enable is set in addition to CONTROLLER INHIBIT or a terminal has been programmed to "ENABLE"	Assign binary input directly on unit via IPOS$^{plus®}$ control word or via fieldbus with ENABLE, e.g. P603 = ENABLE/ STOP
	EMC problems	See system manual and volume 9 Practical Drive Engineering. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
Encoder error after commutation travel in positive direction (2nd movement)	Counting direction of the encoder does not correspond to U,V,W phase sequence of motor	Check to see if encoder counts positive in the direction that the primary was moving. If not, swap connections of U and W motor cables.
	Resolution of encoder system incorrect/Encoder defective	Slide the SL2 linear motor for a defined distance and check with the calculation by MOVITOOLS® if the displayed increments correspond to the calculated value. Adjust the encoder resolution in the linear motor startup, if necessary, and check the distance between scanner and measuring tape.
	Current limit reduced too much	Reset P303 to the value set by linear motor startup. Use parameter P304 for force reduction
Encoder error after commutation travel in negative direction (3rd movement)	Travel distances are not identical because axle is mechanically sluggish	Make sure that the drive travels with easy movement for the entire distance and no other forces are at play (process forces, weight forces)
	Travel distances are not identical because encoder is defective	Slide the SL2 linear motor for a defined distance and check with the calculation by MOVITOOLS® if the displayed increments correspond to the calculated value. Adjust the encoder resolution in the linear motor startup, if necessary, and check the distance between scanner and measuring tape.
	Current limit reduced too much	Reset P303 to the value set by linear motor startup. Use parameter P304 for force reduction
SL2 linear motor overspeed	EMC problems	See system manual and volume 9 Practical Drive Engineering. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
	Defective spot in linear scale	Slide the SL2 linear motor for a defined distance and check with the calculation by MOVITOOLS® if the displayed increments correspond to the calculated value. Perform checks at several spots and check the distance between scanner and measuring tape.

7.2 Problems during operation

Problem	Possible cause	Remedy
SL2 linear motor does not start	Motor cable interrupted	Check motor connection
	Brake is not released	Check brake control; check air supply for pneumatic brakes
SL2 linear motor makes humming noise or does not run smoothly	Fault on encoder cable	See system manual and volume 9 Practical Drive Engineering. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
	Controller parameters set incorrectly	Perform startup of control loop once again
	Encoder connection with primary not rigid enough	Check to see if mechanical connection between encoder and primary is rigid enough.
	Permitted operating temperature of encoder exceeded	• Select travel cycle so that effective value of output current is less than rated current of motor • Arrange for better heat dissipation of primary • Decouple encoder thermally (mounting with plastic distance plate) • Use encoder system with higher permitted operating temperature
SL2 linear motor heats up excessively	Overload	Select travel cycle so that effective value of output current is less than rated current of motor
	Inadequate cooling	Improve cooling or install fan
	Air gap too large, resulting in power loss at same current (see derating table in catalog)	Adjust air gap
	Ambient temperature is too high	Select travel cycle so that effective value of output current is less than rated current of SL2 linear motor
Hiperface® encoder error	Problems on encoder cable	If the problems do not occur during manual sliding, they are often caused by problems in the encoder or TF line. Consult the system manual or volume 9 of Practical Drive Engineering for troubleshooting. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
	Resolver not mounted correctly	Check mounting with the help of encoder manufacturer information: 1. Air gap encoder - measuring tape 2. Alignment encoder - measuring tape 3. for Hiperface encoder: Check mounting direction so that cable output shows in direction smaller absolute values (direction "dot" on the measuring tape if present); check rigidity of encoder mounting. Observe the manufacturer tolerances even with fast accelerations.

8 Inspection / Maintenance

- Use only genuine spare parts in accordance with the valid parts list!
- Motors can become very hot during operation – danger of burns!
- Disconnect the SL2 linear motor from the power supply before starting work and protect it against unintentional re-start!
- Use caution at secondaries → see safety notes section 2

8.1 General maintenance work

The primaries and secondaries are maintenance-free and cannot be repaired. Replace defective parts.

Remove any traces of dirt, chips, dust, etc. from the secondaries with a soft cloth.

Note that mobile cables are subject to wear. They have to be checked for external changes on a regular basis.

8.2 Additional maintenance for Power version

Keep air entry screen on fans free from congestion.

We recommend that you replace the fan after 25,000 hours of operation.

9 Technical Data

9.1 SL2-Basic motor data

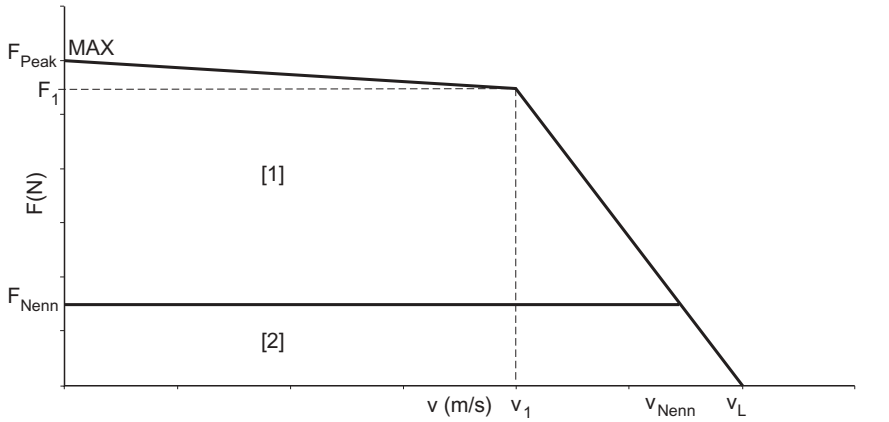


Figure 29: Characteristic

[1] = Dynamic limit forces
[2] = Thermal limit forces
F_{Nenn} = Permanent force
when mounting to a horizontal aluminum cooling surface with
- **four times primary flange surface**
- **10 mm thickness**
- **up to an ambient temperature of 40°C**
- **an installation altitude of up to 1000 m**

F_1 = Maximum force available up to V1
F_{Peak} = Maximum force
v_L = Theoretical maximum traveling velocity
v_1 = Velocity up to which force F_1 is available
v_{Nenn} = Velocity up to which the rated force is available
I_{Nenn} = Rated current
I_1 = Current at F_1
I_{Peak} = Maximum current
F_D = Force through magnetic attraction
m_P = Weight primary
m_S = Weight secondary

Motor type	Force				Speed		Current			MOVIDRIVE® *compact* MCH4_A-xxxx-5A3-4-08
	F_{Peak} [N]	F_1 [N]	F_{Nenn} [N]	F_D [N]	v_1 [m/s]	v_{Nenn} [m/s]	I_{Peak} [A]	I_1 [A]	I_{Nenn} [A]	xxxx = Power at output stage in [kW]
SL2-50VS	650	500	280	1480	- 3 6	- 3,4 8,0	- 6,0 13,9	- 4,4 10,3	- 2,2 5,3	- 0015 0030
SL2-50S	1300	1000	560	2880	1 3 6	1,3 3,4 6,9	4,8 11,8 24,5	3,5 8,7 17,8	1,8 4,5 9,0	0015 0022 0055
SL2-50M	1950	1500	840	4300	1 3 6	1,1 3,3 6,4	5,9 18,0 33,0	4,4 12,8 24,6	2,2 6,5 12,6	0015 0040 0075
SL2-50ML	2600	2000	1120	5700	1 3 6	1,1 3,4 6,9	7,8 24,0 48,0	5,8 17,8 35,5	2,9 9,1 18,2	0015 0055 0110

Motor type	Force				Speed		Current			MOVIDRIVE® *compact* MCH4_A-xxxx-5A3-4-08
	F_{Peak} [N]	F_1 [N]	F_{Nenn} [N]	F_D [N]	v_1 [m/s]	v_{Nenn} [m/s]	I_{Peak} [A]	I_1 [A]	I_{Nenn} [A]	xxxx = Power at output stage in [kW]
SL2-100VS	1325	1000	600	2950	1 3 6	1,1 3,8 6,9	4,8 14,2 24,6	3,4 10,3 17,8	1,9 5,6 9,7	0015 0030 0055
SL2-100S	2650	2000	1200	5160	1 3 6	1,1 3,4 6,9	8,0 25,0 49,0	5,8 17,8 35,5	3,1 9,7 20	0015 0055 0110
SL2-100M	3970	3000	1800	8570	1 3 6	1,3 3,2 6,9	14,2 35,0 75,0	10,3 24,6 53,3	5,6 13,5 29,2	0030 0075 0150
SL2-100ML	5300	4000	2400	11380	1 3 6	1,1 3,4 7,0	16,0 49,0 100,0	11,5 35,5 74,4	6,3 19,5 40,7	0040 0110 0220
SL2-150VS	2000	1500	900	4420	1 3 6	1,1 3,3 6,4	6,1 18,0 35,0	4,4 12,8 24,6	2,4 7,0 13,5	0015 0040 0075
SL2-150S	3900	3000	1800	8640	1 3 6	1,1 3,2 6,4	12,0 33,5 67,0	8,7 24,5 49,0	4,8 13,5 27,0	0022 0075 0150
SL2-150M	5800	4500	2700	12860	1 3 6	1,1 3,4 6,4	18,0 53,0 100,0	13,1 39,0 74,5	7,2 21,5 40,7	0040 0150 0300
SL2-150ML	7700	6000	3600	17000	1 3 6	1,1 3,7 6,4	24,0 76,0 132,0	17,4 56,7 98,0	9,4 31,0 53,8	0055 0220 0370
SL2-200VS	2700	2000	1260	5900	1 3 6	1,1 3,4 7,6	8,1 25,0 55,0	5,7 17,8 39,2	3,3 10,2 22,5	0055 0220 0370
SL2-200S	5200	4000	2520	11520	1 3 6	1,1 3,4 7,2	15,6 48,2 101	11,5 35,5 74,4	6,6 20,4 42,7	0055 0220 0370
SL2-200M	7800	6000	3780	17150	1 3	1,1 3,4	23,4 72,0	17,2 53,3	9,9 30,1	0055 0220
SL2-200ML	10350	8000	5040	22770	1 3	1,1 3,6	30,6 100,0	22,7 74,4	13,0 42,8	0055 0220
SL2-250VS	3170	2400	1500	7370	1 3 6	1,2 3,5 6,6	10,0 30,0 57,0	7,3 21,8 41,2	4,1 12,4 23,5	0055 0220 0370
SL2-250S	6300	4800	3000	14400	1 3 6	1,1 3,3 6,6	18,7 57,0 113,0	13,6 41,2 82,4	7,8 23,5 47,0	0055 0220 0370
SL2-250M	9450	7200	4500	21430	1 3	1,1 3,5	30,0 90,0	21,8 65,0	12,4 37,5	0055 0220
SL2-250ML	12600	9600	6000	28450	1 3	1,1 3,3	37,0 113,0	27,2 82,5	15,5 47,0	0055 0220

Electrical values refer to sine-shaped commutation and are indicated as effective values or refer to them.

9.2 Maximum forces with MOVIDRIVE® compact

Rated velocity 1 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® *compact* servo controller.

The maximum forces that can be reached do not depend on SL2-Basic, SL2-Advance System, SL2-Power System.

Motor V_{rated} = 1 m/s		MOVIDRIVE® *compact* MCH4_A...-5_3 (400/500 V unit) in SERVO operating modes (P700)													
	P [kW]	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450	0550	0750
	I_{nenn} [A]	4	5,5	7	9,5	12,5	16	24	32	46	60	73	89	105	130
	I_{max} [A]	6	8,25	10,5	14,25	18,75	24	36	48	69	90	109,5	133,5	157,5	195
	Systems	F_{max} [N]													
SL2-50VS	Basic Advance Power														
SL2-50S	Basic Advance Power	1300													
SL2-50M	Basic Advance Power	1950													
SL2-50ML	Basic Advance Power	2070	2600												
SL2-100VS	Basic Advance Power	1325													
SL2-100S	Basic Advance Power	2060	2650												
SL2-100M	Basic Advance Power		2490	3050	3970										
SL2-100ML	Basic Advance Power		3060	3710	4800	5300									
SL2-150VS	Basic Advance Power	1970													
SL2-150S	Basic Advance Power	2270	2880	3490	3900										
SL2-150M	Basic Advance Power		3100	3750	4830	5800									
SL2-150ML	Basic Advance Power			4330	5240	6330	7700								
SL2-200VS	Basic	2090	2700												
SL2-200S	Basic		3050	3710	4810	5200									
SL2-200M	Basic				5150	6450	7800								
SL2-200ML	Basic					6840	8390	10350							
SL2-250VS	Basic	2040	2670	3170	5000										
SL2-250S	Basic			3890	5000	6300									
SL2-250M	Basic				5140	6370	7810	9450							
SL2-250ML	Basic					7020	8620	12300	12600						

Rated velocity 3 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® *compact* servo controller.

Motor V_{rated} = 3 m/s		MOVIDRIVE® *compact* MCH4_A...-5_3 (400/500 V unit) in SERVO operating modes (P700)													
	P [kW]	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450	0550	0750
	I_{nenn} [A]	4	5,5	7	9,5	12,5	16	24	32	46	60	73	89	105	130
	I_{max} [A]	6	8,25	10,5	14,25	18,75	24	36	48	69	90	109,5	133,5	157,5	195
	Systems	F_{max} [N]													
SL2-50VS	Basic Advance Power	650													
SL2-50S	Basic Advance Power	735	955	1175	1300										
SL2-50M	Basic Advance Power			1280	1640	1950									
SL2-50ML	Basic Advance Power			1290	1650	2090	2600								
SL2-100VS	Basic Advance Power		830	1020	1325										
SL2-100S	Basic Advance Power				1680	2090	2560	2650							
SL2-100M	Basic Advance Power					2455	2950	3970							
SL2-100ML	Basic Advance Power						2950	4050	5200	5300					
SL2-150VS	Basic Advance Power		1065	1280	1650	2000									
SL2-150S	Basic Advance Power					2425	2950	3900							
SL2-150M	Basic Advance Power						3070	4200	5330	5800					
SL2-150ML	Basic Advance Power							4250	5400	7080	7700				
SL2-200VS	Basic				1650	2100	2610	2700							
SL2-200S	Basic						2920	4050	5200						
SL2-200M	Basic							4340	5490	7480	7800				
SL2-200ML	Basic								5680	7510	9430	10350			
SL2-250VS	Basic				2120	2610	3170								
SL2-250S	Basic							4310	5410	6300					
SL2-250M	Basic								5670	7560	9450				
SL2-250ML	Basic									8270	10340	12260	12600		

Rated velocity 6 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® *compact* servo controller.

Motor V_{rated} = 6 m/s		MOVIDRIVE® *compact* MCH4_A...-5_3 (400/500 V unit) in SERVO operating modes (P700)													
	P [kW]	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450	0550	0750
	I_{nenn} [A]	4	5,5	7	9,5	12,5	16	24	32	46	60	73	89	105	130
	I_{max} [A]	6	8,25	10,5	14,25	18,75	24	36	48	69	90	109,5	133,5	157,5	195
	Systems	F_{max} [N]													
SL2-50VS	Basic Advance Power	320	415	510	650										
SL2-50S	Basic Advance Power			675	840	1040	1280	1300							
SL2-50M	Basic Advance Power					1200	1470	1950							
SL2-50ML	Basic Advance Power						1450	2025	2600						
SL2-100VS	Basic Advance Power				850	1045	1300	1325							
SL2-100S	Basic Advance Power							2025	2600	2650					
SL2-100M	Basic Advance Power							2025	2765	3700	3970				
SL2-100ML	Basic Advance Power								2800	3750	4780	5300			
SL2-150VS	Basic Advance Power					1220	1470	2000							
SL2-150S	Basic Advance Power							2350	2950	3900					
SL2-150M	Basic Advance Power								3150	4220	5290	5800			
SL2-150ML	Basic Advance Power										5600	6570	7700		
SL2-200VS	Basic							1860	2390	2700					
SL2-200S	Basic									3760	4710	5200			
SL2-250VS	Basic							2150	2730	3170					
SL2-250S	Basic									4150	5180	6130	6300		

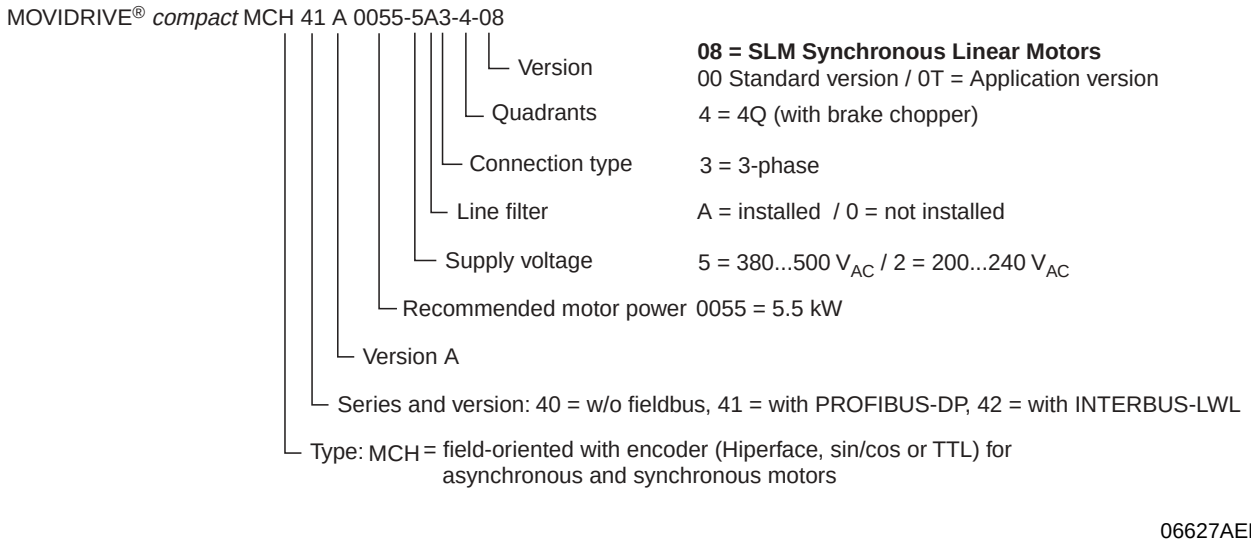
9.3 Part numbers for MOVIDRIVE® compact MCH

The SL2 synchronous linear motors are operated with the MOVIDRIVE®*compact* MCH servo controller from SEW. Only units in application version are available (MOVIDRIVE® B in preparation).

The unit version is designated with -08. This version is the one for SL2 synchronous linear motors.

Unit designation

The following example illustrates the unit designation of MOVIDRIVE®*compact*:


MOVIDRIVE® compact MCH 41 A 0055-5A3-4-08
Version
08 = SLM Synchronous Linear Motors
00 Standard version / 0T = Application version
Quadrants
4 = 4Q (with brake chopper)
Connection type
3 = 3-phase
Line filter
A = installed / 0 = not installed
Supply voltage
5 = 380...500 V_AC / 2 = 200...240 V_AC
Recommended motor power
0055 = 5.5 kW
Version A
Series and version: 40 = w/o fieldbus, 41 = with PROFIBUS-DP, 42 = with INTERBUS-LWL
Type: MCH = field-oriented with encoder (Hiperface, sin/cos or TTL) for asynchronous and synchronous motors

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You will find additional information in the MOVIDRIVE®*compact* system manual.

Assignment of part numbers

MCH40A without fieldbus

Unit part number	Unit designation
828 085 1	MCH40A0015-5A3-4-08
828 087 8	MCH40A0022-5A3-4-08
828 088 6	MCH40A0030-5A3-4-08
828 089 4	MCH40A0040-5A3-4-08
828 090 8	MCH40A0055-5A3-4-08
828 091 6	MCH40A0075-5A3-4-08
828 092 4	MCH40A0110-5A3-4-08
828 093 2	MCH40A0150-503-4-08
828 094 0	MCH40A0220-503-4-08
828 095 9	MCH40A0300-503-4-08
828 096 7	MCH40A0370-503-4-08
828 097 5	MCH40A0450-503-4-08
828 098 3	MCH40A0550-503-4-08
828 099 1	MCH40A0750-503-4-08

MCH41A with Profibus DP

Unit part number	Unit designation
828 100 9	MCH41A0015-5A3-4-08
828 101 7	MCH41A0022-5A3-4-08
828 102 5	MCH41A0030-5A3-4-08
828 103 3	MCH41A0040-5A3-4-08
828 104 1	MCH41A0055-5A3-4-08
828 106 8	MCH41A0075-5A3-4-08
828 107 6	MCH41A0110-5A3-4-08
828 108 4	MCH41A0150-503-4-08
828 109 2	MCH41A0220-503-4-08
828 110 6	MCH41A0300-503-4-08
828 111 4	MCH41A0370-503-4-08
828 112 2	MCH41A0450-503-4-08
828 113 0	MCH41A0550-503-4-08
828 114 9	MCH41A0750-503-4-08

MCH42A with Interbus LWL

Unit part number	Unit designation
828 115 7	MCH42A0015-5A3-4-08
828 116 5	MCH42A0022-5A3-4-08
828 117 3	MCH42A0030-5A3-4-08
828 118 1	MCH42A0040-5A3-4-08
828 120 3	MCH42A0055-5A3-4-08
828 121 1	MCH42A0075-5A3-4-08
828 123 8	MCH42A0110-5A3-4-08
828 124 6	MCH42A0150-503-4-08
828 125 4	MCH42A0220-503-4-08
828 126 2	MCH42A0300-503-4-08
828 127 0	MCH42A0370-503-4-08
828 128 9	MCH42A0450-503-4-08
828 129 7	MCH42A0550-503-4-08
828 130 0	MCH42A0750-503-4-08

10 Declaration of Conformity

10.1 SL2 synchronous linear motors

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Str. 42
D-76646 Bruchsal

Konformitätserklärung

für Linearmotoren
nach ISO/IEC Guide 22, nach DIN EN 45014 Seite 1/1

Declaration of conformity

for linear motors
in accordance with ISO/IEC Guide 22, in accordance with DIN EN 45014 Page 1/1

SEW-EURODRIVE erklärt die Konformität des Produktes
declares that the following product

Typ / Model Synchrone-Linearmotor Reihe SL2-...

Ab.-Nr./ AB.-No.

mit der
are conform with the

Niederspannungsrichtlinie 73/23EG
Low Voltage Directive 73/23EC
und der / and the
EMV-Richtlinie 89/336EG
EMC Directive 89/336EC

auch in Verbindung mit
also when combined with

Optionen und Zubehör
options and asseccories

Angewandte harmonisierte Normen: EN 60204-1
applied harmonized standards: EN 50081-1
EN 50082-2

Die Einhaltung der EMV-Richtlinie setzt einen EMV-gerechten Einbau der Produkte, die Beachtung der spezifischen Installationshinweise und der Produktdokumentation voraus. Dies wurde an bestimmten Anlagekonfigurationen nachgewiesen.

Adherence to the EMC-Directive requires EMC-compliant installation of the products and compliance with the specific installation instructions and product documentation.
Conformity with these Directives was established based on certain plant configurations.

SEW-EURODRIVE GmbH & Co KG

Bruchsal , 25.02.2004 ppa.

E. Dörr
Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany

Ort und Datum der Ausstellung
Place and date of issue

11 Index

A
Assembly 23

C
Coating 13
Corrosion protection 13

D
Documentation 14

E
Electrical installation 26

I
Inspection 41
Installation, electrical 26
Installation, mechanical 22

M
Maintenance 41
Malfunctions 38
Motor cooling unit 21
Motor protection, thermal 30

N
Nameplate 20

O
Overview of types 14

P
Packaging 10
Primaries 21
Product description 14

R
Return delivery 13

S
Safety notes 4
Scope of delivery system components 21
Secondaries 21
Startup 31
Storage conditions 13
System components 16
System world 14

T
Technical data 42
Temperatur sensor 30
Transport 9
Type code 18

U
Unit designation 47

W
Waste disposal 4

Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 · D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service **Competence Center**	**Central** Gear units / Motors	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte-gm@sew-eurodrive.de
	Central Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-mitte-e@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GMBH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9532565 Fax +359 2 9549345 bever@mbox.infotel.bg

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 4322-99 Fax +237 4277-03

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.reynolds@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 sewsales@entelchile.net

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 victor.zhang@sew-eurodrive.cn http://www.sew.com.cn

China			
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew.com.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 sewcol@andinet.com

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 + 220121236 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Paldiski mnt.125 EE 0006 Tallin	Tel. +372 6593230 Fax +372 6593231

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 3 589-300 Fax +358 3 7806-211 http://www.sew-eurodrive.fi sew@sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr Boznos@otenet.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 sew@sewhk.com

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi · Baroda - 391 243 Gujarat	Tel. +91 265 2831021 Fax +91 265 2831087 mdoffice@seweurodriveindia.com
Technical Offices	**Bangalore**	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore	Tel. +91 80 22266565 Fax +91 80 22266569 sewbangalore@sify.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza Andheri Kurla Road, Andheri (E) Mumbai	Tel. +91 22 28348440 Fax +91 22 28217858 sewmumbai@vsnl.net

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 2 96 9801 Fax +39 2 96 799781 sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Toyoda-cho, Iwata gun Shizuoka prefecture, 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 master@sew-korea.co.kr

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Merkines g. 2A LT-4580 Alytus	Tel. +370 315 79204 Fax +370 315 79688 irmantas.irseva@one.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 kchtan@pd.jaring.my

Morocco			
Sales	**Casablanca**	S. R. M. Société de Réalisations Mécaniques 5, rue Emir Abdelkader 05 Casablanca	Tel. +212 2 6186-69 + 6186-70 + 6186-71 Fax +212 2 6215-88 srm@marocnet.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos <FmSdata>[Idot] 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Sales	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 263 RUS-195220 St. Petersburg	Tel. +7 812 5357142 +812 5350430 Fax +7 812 5352287 sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
Sales	**Beograd**	DIPAR d.o.o. Kajmakcalanska 54 SCG-11000 Beograd	Tel. +381 11 3046677 Fax +381 11 3809380 dipar@yubc.net

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 ... 1705 Fax +65 68612827 Telex 38 659 sales@sew-eurodrive.com.sg

Slovakia			
Sales	**Sered**	SEW-Eurodrive SK s.r.o. Trnavska 920 SK-926 01 Sered	Tel. +421 31 7891311 Fax +421 31 7891312 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO – 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 41717-17 Fax +41 61 41717-00 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.co.th

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sirketi Bagdat Cad. Koruma Cikmazi No. 3 TR-81540 Maltepe ISTANBUL	Tel. +90 216 4419163 + 216 4419164 + 216 3838014 Fax +90 216 3055867 sew@sew-eurodrive.com.tr

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 467-3792 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 sewventas@cantv.net sewfinanzas@cantv.net

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